CLAIMS

1. A method of diagnostic imaging in shortened acquisition time for obtaining a reconstructed diagnostic image of a portion of a body of a human patient who was administered with dosage of radiopharmaceutical substance radiating gamma rays, using SPECT (single photon emission computerized tomography), for determination of functional information thereon, comprising the steps of:

(a) acquiring photons emitted from said portion of the body, by means of at least one detector capable of converting the photons into electric signals, wherein acquiring photons emitted from said portion of the body comprises acquiring adjacent angular projections separated by at least 5 degrees;

(b) processing said electric signals by a position logic circuitry and thereby deriving data indicative of positions on said at least one detector, where the photons have impinged the detector; and

(c) reconstructing a diagnostic image of a spatial distribution of the pharmaceutical substance within the portion of the body by iteratively processing said data.

2. The method of claim 1 wherein acquiring photons emitted from said portion of the body comprises acquiring adjacent angular projections separated by at least 6 degrees.

3. The method of claim 1 wherein acquiring photons emitted from said portion of the body comprises acquiring adjacent angular projections separated by at least 7 degrees.

4. The method of claim 1 wherein acquiring photons emitted from said portion of the body comprises acquiring adjacent angular projections separated by at least 8 degrees.

5. The method of claim 1 wherein acquiring photons emitted from said portion of the body comprises acquiring adjacent angular projections separated by at least 9 degrees.

6. The method of claim 1 wherein said iteratively processing said data is done using weight values, derived from functions of either solid angles or solid angles and distances between different discrete elements of the portion of the body and corresponding discrete elements of the angular projection of the portion of the body on the detector.

7. A method of diagnostic imaging in shortened acquisition time for obtaining a reconstructed diagnostic image of a portion of a body of a human patient who was administered with dosage of radiopharmaceutical substance radiating gamma rays, using SPECT (single photon emission computerized tomography), for determination of functional information thereon, comprising the steps of:

(d) acquiring photons emitted from said portion of the body, by means of at least one detector capable of converting the photons into electric signals, wherein the effective acquisition time is less than 16 minutes;

(e) processing said electric signals by a position logic circuitry and thereby deriving data indicative of positions on said at least one detector, where the photons have impinged the detector; and

(f) reconstructing a diagnostic image of a spatial distribution of the pharmaceutical substance within the portion of the body by iteratively processing said data.

8. The method of claim 7 wherein the effective acquisition time is less than 14 minutes.

9. The method of claim 7 wherein the effective acquisition time is less than 12 minutes.

10. The method of claim 7 wherein the effective acquisition time is less than 10 minutes.

11. The method of claim 7 wherein the effective acquisition time is less than 8 minutes.

12. The method of claim 7 wherein said iteratively processing said data is done using weight values, derived from functions of either solid angles or solid angles and distances between different discrete elements of the portion of the body and corresponding discrete elements of the angular projection of the portion of the body on the detector.

13. The method of claim 7, wherein the photons are acquired in a list-mode procedure.

14. A method of diagnostic imaging in shortened acquisition time for obtaining a reconstructed diagnostic image of a portion of a body of a human patient who was administered with dosage of radiopharmaceutical substance radiating gamma rays, using SPECT (single photon emission computerized tomography), for determination of functional information thereon, comprising the steps of:

(a) acquiring photons emitted from said portion of the body, by means of at least one detector capable of converting the photons into electric signals, wherein acquiring photons emitted from said portion of the body comprises acquiring angular projections, and wherein the total time of photon acquisition is less than 20 minutes;

(b) processing said electric signals by a position logic circuitry and thereby deriving data indicative of positions on said at least one detector, where the photons have impinged the detector; and

(c) reconstructing an diagnostic image of a spatial distribution of the pharmaceutical substance within the portion of the body by iteratively processing said data.

15. The method of claim 14 wherein:

said radiopharmaceutical comprises Technetium;
said at least one detector comprises a single detector;
the angular projections span about 360 degrees;
and
said diagnostic imaging comprises bone SPECT.

16. The method of claim 14 wherein:
said radiopharmaceutical comprises Technetium;
said at least one detector comprises two detectors;
the angular projections span about 360 degrees;
the total time of photon acquisition is less than 10 minutes;
and
said diagnostic imaging comprises bone SPECT.

17. The method of claim 14 wherein:
said radiopharmaceutical comprises Technetium;
said at least one detector comprises a single detector;
the angular projections span about 180 degrees;
the total time of photon acquisition is less than 13 minutes;
and
said diagnostic imaging comprises bone SPECT.

18. The method of claim 14 wherein:
said radiopharmaceutical comprises Technetium;
said at least one detector comprises two detectors;
the angular projections span about 180 degrees;
the total time of photon acquisition is less than 10 minutes;
and
said diagnostic imaging comprises bone SPECT.

19. The method of claim 14 wherein:

said radiopharmaceutical comprises an isotope selected from the group of Technetium and Thallium;

said at least one detector comprises a single detector;

the angular projections span about 180 degrees;

the total time of photon acquisition is less than 15 minutes;

and

said diagnostic imaging comprises cardiac imaging.

20. The method of claim 14 wherein:

said radiopharmaceutical comprises an isotope selected from the group of Technetium and Thallium;

said at least one detector comprises two detectors;

the angular projections span about 180 degrees;

the total time of photon acquisition is less than 10 minutes;

and

said diagnostic imaging comprises cardiac imaging.

21. The method of claim 14 wherein:

said radiopharmaceutical comprises an isotope selected from the group of Technetium and Thallium;

said at least one detector comprises a single detector;

the total time of photon acquisition is less than 15 minutes;

and

said diagnostic imaging comprises brain SPECT.

22. The method of claim 14 wherein:

said radiopharmaceutical comprises an isotope selected from the group of Technetium and Thallium;

said at least one detector comprises two detectors;

the total time of photon acquisition is less than 15 minutes;

and

said diagnostic imaging comprises brain SPECT.

23. The method of claim 14 wherein:

said radiopharmaceutical comprises an isotope selected from the group of Gallium, Indium and Iodine;

said at least one detector comprises a single detector;

the total time of photon acquisition is less than 25 minutes;

and

said diagnostic imaging comprises Medium energy Oncology SPECT.

24. The method of claim 14 wherein:

said radiopharmaceutical comprises an isotope selected from the group of Gallium, Iodine and Indium;

said at least one detector comprises two detectors;

the total time of photon acquisition is less than 20 minutes;

and

said diagnostic imaging comprises Medium energy Oncology SPECT.

25. The method of claim 14, wherein said iteratively processing said data is done using weight values, derived from functions of either solid angles or solid angles and distances between different discrete elements of the portion of the body and corresponding discrete elements of the projection of the portion of the body on the detector.

26. The method of claim 14, wherein the photons are acquired in a list-mode procedure.

27. A method of shortening acquisition time for obtaining a reconstructed image of a portion of a body of a human patient who was administered with dosage of radiopharmaceutical substance radiating gamma rays, using SPECT (single photon emission computerized tomography), for determination of functional information thereon, comprising the steps of:

(a) acquiring photons emitted from said portion of the body, by means of a detector capable of converting the photons into electric signals, wherein the total time of photon acquiring is equal or less than three quarters of the clinically acceptable acquisition time;

(b) processing said electric signals by a position logic circuitry and thereby deriving therefrom data indicative of positions on said photon detector crystal, where the photons have impinged the detector; and

(c) reconstructing an image of a spatial distribution of the pharmaceutical substance within the portion of the body by iteratively processing said data.

28. The method of claim 26 wherein said total time of photon acquiring is equal or less than two thirds of the clinically acceptable acquisition time.

29. The method of claim 26 wherein said total time of photon acquiring is less than one half of the clinically acceptable acquisition time.

30. The method of claim 26 wherein said total time of photon acquiring is equal or less than one third of the clinically acceptable acquisition time.

31. The method of claim 26 wherein said iteratively processing said data is in conjunction with weight values, derived from functions of either solid angles or solid angles and distances between different discrete elements of the portion of the body and corresponding discrete elements of the projection of the portion of the body on the detector.

32. The method of claim 26 wherein said iteratively processing said data comprises arranging the data in angular projections.